CLAIMS

What is claimed is:

1. A thin film interleaver for use in CWDM fiber-optic multiplexing and demultiplexing, the thin film interleaver comprising:

a dual fiber collimator comprising:

an optical substrate;

a thin film portion applied to the optical substrate, the thin film portion formed to allow a first group of channels to pass through the thin film portion while reflecting a second group of channels each of the first group of channels being adjacent to at least one of the channels in the second group of channels;

an input fiber for receiving an optical signal comprised of the first and second groups of channels; and

a reflection fiber for receiving the second group of channels after they have been reflected by the thin film portion.

2. The thin film interleaver of claim 1, further comprising a single fiber collimator optically coupled to the dual fiber collimator for receiving the first group of channels after the first group of channels passes through the thin film portion.

3. The thin film interleaver of claim 1, the thin film portion further comprising a first matching layer, the first matching layer having an index of refraction for creating an efficient interface between the optical substrate and portions of the thin film portion.

WORKMAN NYDEGGER
A PROFESSIONAL CORPORATION
ATTORNEYS AT LAW
1000 EAGLE GATE TOWER
60 EAST SOUTH TEMPLE
SALT LAKE CITY, UTAH 84111

4. The thin film interleaver of claim 1, the thin film portion further comprising a plurality of cavities, wherein each of the plurality of cavities comprises:

a plurality of thin film layers; and

a spacer.

5. The thin film interleaver of claim 4, the thin film portion comprising 4 to 6 cavities.

6. The thin film interleaver of claim 4, each of the plurality of cavities comprising 72 to 74 thin film layers.

7. The thin film interleaver of claim 4, each thin film layer being about 1/4 of a median wavelength, the median wavelength being that of the median channel of the first and second group of channels.

8. The thin film interleaver of claim 4, one of the plurality of cavities being disposed at the end of the plurality of cavities having a spacer with an index of refraction for matching the dual fiber collimator to air surrounding the dual fiber collimator.

WORKMAN NYDEGGER
A PROFESSIONAL CORPORATION
ATTORNEYS AT LAW
1000 EAGLE GATE TOWER
60 EAST SOUTH TEMPLE
SALT LAKE CITY, UTAH 84111

9. A demultiplexer for use in fiber-optic CWDM applications, the demultiplexer comprising:

a first stage that comprises a thin film interleaver, the thin film interleaver comprising a thin film portion being formed to exhibit a flat top frequency response, wherein the thin film portion passes a first group of channels to pass through the thin film portion while reflecting a second group of channels, each channel of the first group of channels being adjacent to a channel in the second group of channels; and

at least one subsequent stage that includes at least two interleavers for receiving the first and second group of channels.

10. The demultiplexer of claim 9, the thin film interleaver comprising a thin film portion being formed to exhibit a wide frequency response without increasing cross-talk of adjacent channels.

11. The demultiplexer of claim 9, the at least two interleavers being fused fiber interleavers.

12. The demultiplexer of claim 9, the at least two interleavers being thin film interleavers.

13. The demultiplexer of claim 9, the thin film portion further comprising a plurality of cavities wherein each of the plurality of cavities comprises:

a plurality of thin film layers; and

WORKMAN NYDEGGER
A PROFESSIONAL CORPORATION
ATTORNEYS AT LAW
1000 EAGLE GATE TOWER
60 EAST SOUTH TEMPLE
SALT LAKE CITY, UTAH 84111

a spacer.

14. The demultiplexer of claim 13, the thin film portion comprising 4 to 6 cavities.

15. The demultiplexer of claim 13, each of the plurality of cavities comprising 72 to 74 thin film layers.

16. The demultiplexer of claim 13, each thin film being about 1/4 of a median wavelength, the median wavelength being the median of the first and second group of channels.

17. The demultiplexer of claim 13, wherein the thin film interleaver is configured to maintain low loss of a signal when small changes in a channel are experienced while maintaining separation between channels.

WORKMAN NYDEGGER
A PROFESSIONAL CORPORATION
ATTORNEYS AT LAW
1000 EAGLE GATE TOWER
60 EAST SOUTH TEMPLE
SALT LAKE CITY, UTAH 84111

18. A method of manufacturing a thin film interleaver for use in fiber-optic CWDM multiplexing and demultiplexing the method comprising:

forming a thin film portion on a dual fiber collimator having an input fiber and a reflection fiber, the thin film portion being formed to:

exhibit a flat top frequency response; and

separate channels input on the input fiber by allowing a first group of channels to pass through the thin film portion while reflecting a second group of channels into the reflection fiber each of the first group of channels being adjacent to a channel in the second group of channels.

19. The method of claim 18, wherein forming comprises depositing the thin film portion on the dual fiber collimator by chemical deposition.

20. The method of claim 18, wherein forming comprises depositing the thin film portion on the dual fiber collimator by vapor deposition.

21. The method of claim 18, wherein forming comprises growing the thin film portion on the dual fiber collimator.

22. The method of claim 18, further comprising arranging a single fiber collimator to collimate the first group of channels into an output fiber attached to the single fiber collimator.

WORKMAN NYDEGGER
A PROFESSIONAL CORPORATION
ATTORNEYS AT LAW
1000 EAGLE GATE TOWER
60 EAST SOUTH TEMPLE
SALT LAKE CITY, UTAH 84111